

ASSESSING GENERAL INTELLIGENCE IN INFLUENCING PERFORMANCE OF MATHEMATICS

By

R. RAJKUMAR *

G. HEMA **

* Research Scholar, Department of Education, Periyar University, Salem, Tamil Nadu, India.

** Assistant Professor, Department of Education, Periyar University, Salem, Tamil Nadu, India.

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ABSTRACT

Academic achievement is very important in any educational setting, as it indicates the level of students' competence in respect of the academic content. This is obviously defined in terms of performance which represents the most understandable and regularly accepted pointer of performance in educational contexts (Ladipo & Gbotosho, 2015). Intelligence influences our ability on all level of intellectual tasks. Generally, people who are good at mathematics associate intelligence with it. Not everybody, but majority think on these lines. For them, being good at mathematics is an important criteria for being general intelligent. This study investigated the extent to which general intelligence determine the performance in mathematics among undergraduate students. The investigator used random sampling technique for selecting the sample from the population. The sample consists of 310 students studying undergraduate mathematics in Tirunelveli District, Tamil Nadu, India. Standardized tool namely Test of General Intelligence (TGI) for College Students by Misra and Pal was used and its reliability value was 0.81. The data collected were subjected to statistical techniques like *t*-test and *F*-test. Further analysis showed that majority of the undergraduate mathematics students had moderate level of general intelligence. Findings on relationships between general intelligence and performance of undergraduate mathematics students are positively correlated. The study recommended that the performance of study groups should be formed in the college to help in cooperative learning of outperformed students than male students. Since these groups will also help the weaker students to enhance the performance in their subjects.

Keywords: General Intelligence, Undergraduate Mathematics Students, Mathematics, Academic Performance, Influence.

INTRODUCTION

Intelligence is acknowledged by all teachers that one of the most important single variable which affects schooling is the quality of behavior called intelligence. In psychology literature, intelligence has been treated as a construct; no one knows what intelligence is. Several definitions have been advanced by psychologists but no two psychologists agree on a single definition of the term (Mangal, 2011). Stern (2009) stated that intelligence is a general capacity of an individual consciously to adjust his/her thinking to new requirement. It is the general mental adaptability to new problems and conditions of life. Kant says mathematics is the indispensable

instrument of all physical researches. Gauss says mathematics is the queen of sciences and arithmetic is the queen of all mathematics. According to Bacon, mathematics is the gateway and key to all sciences which means mathematics is the science of number and space. Aristotle in his view about mathematics is the study of quantity (Mangal, 2016; Zubair, 2012).

1. Significance of the Study

The human mind does not record sense experience directly, but rather it registers and selectively documents a highly processed and meaning-centered version of experience. Conventional beliefs about intelligence have too long been oppressors of the human spirit and

antagonists of self-esteem and human potential. It is now time to see intelligence as a liberator as a marvelously rich entity that help explain the individuality of our species. It is to see possibilities for human expression as rolling forward indefinitely, proceeding in pleasing directions possibilities whose hazy outlines we can barely perceive (Martinez, 2000). May be each of us possess a certain amount of goal in general.

Research in cognitive development has led to understanding of basic processes involved in academic skills, like reading and mathematics problem-solving. Mathematics has great cultural values; it has helped in transmitting and enriching our culture. It has helped in the development of various subjects and occupations. It is mainly responsible for the progress of our civilization and it has been rightly said, "mathematics is the mirror of civilization". It has helped man in bringing him to the advanced stage of development. Having the doubt whether the performance of the Undergraduate students of mathematics is attributed by their intelligence, the investigator took this study.

2. Objectives of the Study

In the present study, the following objectives are framed to measure the assessing general intelligence in influencing performance of mathematics among undergraduate mathematics students.

- To identify the level of general intelligence of undergraduate mathematics students.
- To identify the level of performance of undergraduate mathematics students.
- To find out the significance of difference, if any, in general intelligence of undergraduate mathematics students with regards to background variables.
- To find out the significance of difference, if any, in performance of undergraduate mathematics students with regards to background variables.
- To find out the correlation between general intelligence and performance of undergraduate mathematics students.

The background variables are gender, age, nature of the

college, nature of the management, locality of the college, and types of the family.

3. Hypotheses Formulated

The following hypotheses are formulated based on the objectives.

- The level of general intelligence of undergraduate mathematics students is average.
- The level of performance of undergraduate mathematics students is average.
- There is no significant difference, if any, in general intelligence of undergraduate mathematics students with regard to background variables.
- There is significant difference, if any, in performance of undergraduate mathematics students with regard to background variables.
- There is no significant relation between general intelligence and performance of undergraduate mathematics students.

4. Research Methodology

4.1 Method

The method adopted in the present study is survey method which comes under descriptive research.

4.2 Sample

The sample of the study consists of the students studying undergraduate mathematics. The investigator selected 310 students from 10 Colleges who are studying in undergraduate mathematics in Tirunelveli district, Tamil Nadu, India, and followed stratified random sampling technique. The sample consists of male and female undergraduate mathematics students.

4.3 Tool Used

The present study was designed to assess the general intelligence and performance in the subject mathematics among undergraduate students. General Intelligence Scale was developed and standardized by Misra and Pal which contains 60 items. Its reliability value was 0.81 (Misra & Pal, 1971).

5. Data Analysis

The collected data were analyzed by using statistical

techniques, like mean, standard deviation, t-test, F test, and Correlation.

From Table 1 it is inferred that more than 69% of undergraduate mathematics students have moderate level of general intelligence.

In Table 2, since p value is greater than 0.05, the null hypothesis is accepted at 5% level of significance. It shows that there is no significant difference in general intelligence of undergraduate students with regard to gender, locality of the college, and type of family.

In this table, since p value is less than 0.05, the null hypothesis is rejected at 5% level of significance. It shows that there is a significant difference in general intelligence of undergraduate mathematics students with regard to nature of the college.

Further, the mean scores show that students of Women's college has more general intelligence than the students from co-education college.

In Table 3, since p value is less than 0.05, the null hypothesis is rejected at 5% level of significance. It shows

General Intelligence	N	%
Low	57	18.4
Moderate	216	69.7
High	37	11.9

Table 1. Level of General Intelligence of Undergraduate Mathematics Students

Main Variables	Sub Variables	N	M	SD	t-value	p value
Gender	Male	32	43.59	10.072	1.747	0.089
	Female	278	46.88	10.187		
Nature of the College	Women	71	52.91	7.851	7.264	0.000*
	Co-education	239	44.65	10.074		
Locality of the College	Rural	234	46.06	9.513	1.296	0.145
	Urban	76	48.03	12.055		
Type of the Family	Nuclear	248	46.70	9.891	0.496	0.621
	Joint	62	45.91	11.459		

*Significant at 5% level

Table 2. Significance of Difference in General Intelligence of Undergraduate Mathematics Students with regard to Selected Variables

that there is a significant difference in general intelligence of undergraduate mathematics students with regard to age and nature of management.

It shows that the undergraduate mathematics students aged below 19 have more general intelligence than those aged 19 and above. Further, it shows that the undergraduate mathematics students of government college have more general intelligence than the students of aided and self-finance college.

From Table 4 it is inferred that more than 71% of undergraduate mathematics students have moderate level of performance.

In Table 5, since p value is greater than 0.05, the null hypothesis is accepted at 5% level of significance. It shows that there is no significant difference in the performance of undergraduate students with regard to locality of college and type of family.

In this table, since p value is less than 0.05, the null hypothesis is rejected at 5% level of significance. It shows that there is significant difference in the performance of undergraduate students with regard to gender and

Background Variables	Groups	Sum of Square	df	Mean Square	F	p value
Age	Between Groups	347.415	2	173.708	4.742	0.009*
	With in Groups	11245.879	307	36.632		
	Total	11593.294	309			
Nature of Management	Between Groups	2975.355	2	1487.678	15.626	0.000*
	With in Groups	29228.238	307	95.206		
	Total	32203.593	309			

*Significant at 5% level

Table 3. 'F' Values in General Intelligence of Undergraduate Mathematics Students with regard to Age and Nature of Management

Performance	N	%
Low	43	13.9
Moderate	221	71.3
High	46	14.8

Table 4. Level of Performance of Undergraduate Mathematics Students

Main Variables	Sub Variables	N	M	S D	t-value	p value
Gender	Male	32	68.34	11.798	4.117	0.000*
	Female	278	77.17	8.189		
Nature of the College	Women	71	78.70	6.584	3.194	0.009*
	Co-Education	239	75.53	9.512		
Locality of the College	Rural	234	75.85	9.273	1.502	0.162
	Urban	76	77.51	8.107		
Type of the Family	Nuclear	248	76.17	9.109	0.343	0.733
	Joint	62	76.60	8.704		

*Significant at 5% level

Table 5. Significance of Difference in Performance of Undergraduate Mathematics Students with regard to Selected Variables

nature of college.

The mean scores show that performance of the students of female students is more than the male students and the mean scores show that performance of the students of Women's college performed well than the students of co-education college.

In Table 6, since p value is greater than 0.05, the null hypothesis is accepted at 5% level of significance. It shows that there is no significant difference in performance of undergraduate students with regard to nature of management.

In Table 7, since p value is less than 0.01, the null hypothesis is rejected at 1% level of significance. It shows that there exists a significant and positive correlation between undergraduate mathematics student's general intelligence and performance.

Background Variables	Groups	Sum of Square	df	Mean Square	F	p value
Age	Between Groups	302.728	2	151.364	1.872	0.156
	With in Groups	24820.140	307	80.847		
	Total	25122.868	309			
Nature of Management	Between Groups	387.630	2	193.815	2.406	0.092
	With in Groups	24735.238	307	80.571		
	Total	25122.868	309	309		

Table 6. the 'F' Values in Performance of Undergraduate Mathematics Students with regard to Age and Nature of Management

Variables	N	Pearson Correlation	p value
General Intelligence	310	0.262	0.000*
Performance			

*Significant at 1% level

Table 7. Relationship in General Intelligence and Performance of Undergraduate Mathematics Students

6. Major Findings

- More than 69% and 71% have moderate level of general intelligence and performance of undergraduate mathematics students, respectively.
- There was no significant difference in the general intelligence of undergraduate students with regard to gender, locality of college, and type of family. There exists significant difference in the remaining cases of age, nature of the college, and nature of management.
- There was no significant difference in the performance of undergraduate students with regard to locality of college, type of family, age, and nature of management. There exists significant difference in the remaining cases of gender and nature of college.
- There exists significant and positive correlation between undergraduate mathematics student's general intelligence and performance.

7. Discussion and Recommendations

The undergraduate students aged below 19 have more intelligence than aged 19 and above. Intelligence may not depend on experience. This is because 19 and above 19 aged students have low intelligence, then the special intelligence test and program are given to 19 and above aged students.

The general intelligence of the Women's college students have more than the students of co-education colleges. These findings are found very interesting because Women's college students have more extension activities and intelligence programme. So the general intelligence for providing critical thinking, problem solving ability based activities, and to overcome subordination through orientation exposure program are improved. Gupta's (2011) study findings support these results, as adolescent

girls with low intelligence are more prone to depression as compared to adolescent girls with high intelligence. Female teacher trainees were found to be more intelligent as compared to male teacher trainees (Husain, 2011).

The undergraduate mathematics students of government colleges have more general intelligence than the students of aided and self-finance colleges. In order to improve the intelligence of aided and self-financing college, one must help to cultivate good study habits.

Pietsch et al.'s (2003) study supports this finding, where the performance of female students is more than the male students. Study groups should be formed in the college to help in cooperative learning. These groups will also help the weaker students to perform.

There exists significant and positive correlation between undergraduate mathematics student's general intelligence and performance. This finding supports Aswal (2001), Jadhav and Patil (2010), Gupta (2010), and Shively and Ryan's (2013) studies that there exists a significant correlation between intelligence and achievement in mathematics.

Summary and Conclusion

The conclusion that could be derived from this study is that majority of the undergraduate mathematics students have moderate level of general intelligence. It is endorsed that the undergraduate mathematics students aged below 19 had more general intelligence than those aged 19 and above. It is found that the undergraduate mathematics students of government colleges had more general intelligence than the students of aided and self-finance colleges. The reason may be that the government college admissions are purely based on merit. It is observed that most of the undergraduate mathematics students had moderate level of performance in mathematics. Moderate level of general intelligence could lead to moderate level of performance. It is found that the performance of the female students is more than the male students and also female students have more sincerity and obedience than

the male students. The performance of students of Women's colleges is more than the students of co-education colleges. The teen-age disturbance at women college may be minimal than the co-education colleges. Peer discussion and safety environment may also influence the performance. This study proved that general intelligence and performance of undergraduate mathematics students are positively correlated.

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ABOUT THE AUTHORS

R. Rajkumar is currently pursuing his Doctoral Degree in the Department of Education at Periyar University, Salem, Tamil Nadu, India. He has been working in doctoral research in the field of technology in mathematics education and Metacognition in Education. He has presented twenty four papers in the conferences/seminars and has published five articles in both International and National level Journals.



Dr. G. Hema is currently working as an Assistant Professor in the Department of Education at Periyar University, Salem, Tamil Nadu, India. She has got rich teaching experience of 20 years, as teacher, Lecturer, and Principal in reputed institutions of schools and colleges of Teacher Education. She has published 2 books and contributed more than 50 articles in National and International Journals and papers presented in seminars/conferences from international level to regional level. Under her guidance, one scholar was awarded with Ph.D and nine pre-doctorate scholars are currently pursuing. 14 scholars were awarded with M.Phil. Her research areas of interest are Cognitive Psychology and Educational Technology. She is a life member in AIAER. She is an editor of Maha Journal of Education, The Kongu Regional Educational and Research Foundation, Salem. She is an active reviewer of Universal Journal of Educational Research of Horizon Research Publishing Corporation, USA. She is honoured with Best Teachers Award and a Special award, The Best NSS Programme Officers for her meritorious and commendable contributions in the field of Education and Social activities.

